

CLAIMS

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1. (Amended) An actuator device, characterized by:
a device housing;
5 a drive motor located in the device housing;
a power transmission mechanism located in the device
housing and is coupled to the drive motor;
an output shaft coupled to the power transmission
mechanism, rotation of the drive motor is transmitted to the
10 output shaft via the power transmission mechanism;
a sensor for detecting the rotation angle of the output
shaft;
a sensor accommodating portion for accommodating the
sensor;
15 a connector portion including a connector housing and a
connector terminal, which is incorporated in the connector
housing and is connected to an external connector; and
a power supply portion including a power supply terminal,
which is connected to the drive motor and supplies electric
20 power to the drive motor,
wherein the power supply terminal and the sensor are
electrically connected to the connector terminal, electric
power is supplied to the drive motor from the outside and a
rotation angle signal obtained by the sensor is sent to the
25 outside via the external connector and the connector terminal,
and
wherein the sensor accommodating portion, the connector
portion, and the power supply portion are integrally formed to
form a single assembly mounted on the device housing.
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2. (Amended) The actuator device according to claim 1,
characterized in that the device housing includes a first case
and a second case, and when the assembly is mounted on the
device housing, the first case and the second case hold the
35 connector portion.

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3. (Amended) The actuator device according to claim 1,
characterized in that the device housing includes a first case
and a second case, and when the assembly is mounted on the
5 device housing, the first case and the second case hold the
connector housing.

4. (Amended) The actuator device according to any one of
claims 1 to 3, characterized in that the power transmission
10 mechanism includes a plurality of gears, one of the gears has
the output shaft and includes a recess for accommodating the
sensor accommodating portion.

5. (Amended) The actuator device according to claim 4,
15 characterized in that the gear having the recess has a
cylindrical gear portion, and the cylindrical gear portion
defines the recess.

6. (Amended) The actuator device according to claim 4 or
20 5, characterized in that the sensor is coupled to the output
shaft to rotate integrally with the output shaft in the recess.

7. (Amended) The actuator device according to any one of
claims 1 to 6, characterized in that the assembly is
25 substantially L-shaped.

8. (Amended) The actuator device according to any one of
claims 1 to 6, characterized in that the sensor accommodating
portion, the connector portion, and the power supply portion
30 are molded using resin to form the assembly.

9. (Amended) The actuator device according to claim 8,
characterized in that the power supply terminal and the
connector terminal are integrally incorporated in the assembly.

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10. (Amended) The actuator device according to any one
of claims 1 to 6, characterized in that the power supply
terminal and the connector terminal are formed of a single
conductive plate, the conductive plate further including a
5 wiring portion, the wiring portion including a connecting
portion, which is connected to the sensor, and a coupling
portion, which can be arbitrarily cut, and the connecting
state among the connecting portion, the connector terminal,
and the power supply terminal is determined in accordance with
10 the cutting state of the coupling portion.

11. (Amended) The actuator device according to claim 10,
characterized in that the assembly is molded using resin such
that the conductive plate is integrally incorporated.

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12. (Amended) The actuator device according to claim 11,
characterized in that the assembly is molded such that the
wiring portion is exposed to the outside.

20 13. (Amended) The actuator device according to any one
of claims 1 to 12, characterized in that the power
transmission mechanism includes a motor gear attached to the
rotary shaft of the drive motor and a plurality of gears
forming a series of gears coupled to the motor gear, and at
25 least one of the gears, which form the series of gears,
integrally includes a depression portion for depressing the
gear in the axial direction.

14. (Amended) The actuator device according to claim 13,
30 characterized in that the gear including the depression
portion has a shaft portion, and the depression portion is
located radially outward of the shaft portion.

15. (Amended) The actuator device according to claim 14,
35 characterized in that the gear including the depression

portion further includes:

a small diameter gear portion located on the shaft portion;

5 a cylindrical large diameter gear portion located radially outward of the shaft portion; and

a coupling portion, which radially extends between the shaft portion and the large diameter gear portion to integrally couple the large diameter gear portion to the shaft portion,

10 wherein the depression portion extends from the coupling portion in the circumferential direction of the corresponding gear.

16. (Amended) The actuator device according to claim 13,
15 characterized in that the gear including the depression portion has a small diameter gear portion and a large diameter gear portion, which are integrally formed with each other, and the depression portion is provided on the large diameter gear portion to be located radially outward of the small diameter
20 gear portion.

17. (Amended) The actuator device according to claim 15 or 16, characterized in that the motor gear is a worm, and the large diameter gear portion is a worm wheel engaged with the
25 worm.

18. (Amended) The actuator device according to any one of claims 13 to 17, characterized in that the depression portion is one of a plurality of depression portions arranged
30 at equal angular intervals about the axis of the corresponding gear.

19. (Amended) The actuator device according to any one of claims 13 to 18, characterized in that the device housing
35 has a receiving surface for slidably receiving the depression

portion, the receiving surface has a recess for accommodating lubricant agent at a position corresponding to a sliding path of the depression portion.

5 20. (Amended) The actuator device according to claim 19, characterized in that the recess is groove-like and extends to be inclined with respect to the radial direction of the corresponding gear.

10 21. (Amended) An actuator device, comprising:
a drive motor, which has a rotary shaft;
a motor gear attached to the rotary shaft;
a plurality of gears forming a series of gears coupled
to the motor gear; and
15 an output shaft coupled to the series of gears, rotation of the rotary shaft is transmitted to the output shaft via the series of gears,
the actuator device being characterized in that at least one of the gears, which form the series of gears, integrally
20 includes a depression portion, which depresses the gear in the axial direction, and the depression portion applies load on the rotary shaft in a direction that intersects the axis of the rotary shaft.

25 22. (Amended) The actuator device according to claim 21, characterized in that the gear including the depression portion has a shaft portion, and the depression portion is located radially outward of the shaft portion.

30 23. (Added) The actuator device according to claim 22, characterized in that the gear including the depression portion further includes:

a small diameter gear portion located on the shaft portion;

35 a cylindrical large diameter gear portion located

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radially outward of the shaft portion; and

a coupling portion, which radially extends between the shaft portion and the large diameter gear portion to integrally couple the large diameter gear portion to the shaft portion,

wherein the depression portion extends from the coupling portion in the circumferential direction of the corresponding gear.

24. (Added) The actuator device according to claim 21, characterized in that the gear including the depression portion has a small diameter gear portion and a large diameter gear portion, which are integrally formed with each other, and the depression portion is provided on the large diameter gear portion to be located radially outward of the small diameter gear portion.